COMMONWEALTH of VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
DRAFT PERMIT *October 21, 2021*
TO WITHDRAW GROUNDWATER IN THE
EASTERN SHORE GROUNDWATER MANAGEMENT AREA

Permit Number: GW0038700
Effective Date: Xxxxxxx XX, 2021
Expiration Date: Xxxxxxx XX, 2031

Pursuant to the Ground Water Management Act of 1992 (Section 62.1-254 et seq. of the Code of Virginia) and the Groundwater Withdrawal Regulations (Regulations) (9VAC25-610-10), the State Water Control Board (Board) hereby authorizes the Permittee to withdraw and use groundwater in accordance with this permit.

Permittee Northampton County

Facility Bayview Community

Facility Address 22273 Laughing Gull Rd.

Cape Charles, VA 23310

The Permittee's authorized groundwater withdrawal shall not exceed:

5,100,000 gallons per year,
750,000 gallons per month,
24,000 gallons per day

The permitted withdrawal will be used to provide a non-municipal public water supply to a residential community. Other uses are not authorized by this permit.

The Permittee shall comply with all conditions and requirements of the permit.

By direction of the State Water Control Board, this Permit is granted by:

Signed _____ Date _____

Director, Office of Water Supply

This permit is based on the Permittee's application submitted on June 30, 2014, and subsequently amended to include supplemental information provided by the Permittee. The following are conditions that govern the system set-up and operation, monitoring, reporting, and recordkeeping pertinent to the Regulations.

Part I
Operating Conditions

A. Authorized Withdrawal

1. The withdrawal of groundwater shall be limited to the following wells identified in the table below. Withdrawals from wells not included in Table 1 are not authorized by this permit and are therefore prohibited. 9VAC25-610-140 A

Table 1

Owner Well Name	DEQ Well #	Well Depth (ft bls)	Screen Intervals	Aquifer	Latitude	Longitude	Datum
North #2	165-00399	245	205-235 ft/bls	Middle Yorktown-Eastover	37° 16' 26.1"	75° 57' 51.8"	NAD 27
South #1	165-00400	245	205-235 ft/bls	Middle Yorktown-Eastover	37° 16' 25.8"	75° 57' 51.8"	NAD 27

2. Any actions that result in a change to the status, construction, or pump intake setting of wells included in this permit must be pre-approved by the Department of Environmental Quality (Department) in writing prior to implementing the change and a revised GW-2 Form must be submitted to the Department within 30 days after the physical construction of a well is altered or the pump intake setting has been changed. If changes are a result of an emergency, notify the Department within 5 days from the change. 9VAC25-610-140 C

B. Public Water Supplies

1. Daily withdrawal limits set forth in this permit are consistent with the requirements and conditions of the Virginia Department of Health (VDH) Waterworks Operation Permit No. 3131061. 9VAC25-610-140 A 5

2. The Permittee shall submit copies of an updated Waterworks Operation Permit and the associated Engineering Description Sheets to the Department within 30 days of receipt from the Virginia Department of Health. 9VAC25-610-140 C

C. Pump Intake Settings

1. The Permittee shall not place a pump or water intake device lower than the top of the uppermost confined aquifer that a well utilizes as a groundwater source or lower than the bottom of an

unconfined aquifer that a well utilizes as a groundwater source in order to prevent dewatering of the aquifer, loss of inelastic storage, or damage to the aquifer from compaction. 9VAC25-610-140 A 6

2. Pump settings in individual wells are limited as follows. Any change in the pump setting must receive prior approval by the Department.

Owner Well Name	DEQ Well #	Max Pump Setting (feet below land surface)
North #2	165-00399	200
South #1	165-00400	200

D. Reporting

1. Water withdrawn from each shall be recorded monthly at the end of each month and reported to the Office of Water Supply, in paper or electronic format, on a form provided by the Department by the tenth (10^{th}) day of each January, April, July and October for the respective previous calendar quarter. Records of water use shall be maintained by the Permittee in accordance with Part III.F, 1 through 5 of this permit. 9VAC25-610-140 A 9

2. The Permittee shall report any amount in excess of the permitted withdrawal limit by the fifth (5th) day of the month following the month when such a withdrawal occurred. Failure to report may result in compliance or enforcement activities. 9VAC25-610-140 C

3. The following is a summary of reporting requirements for specific facility wells:

Owner Well Name	DEQ Well #	Reporting Requirements
North #2	165-00399	Water Use
South #1	165-00400	Water Use

E. Water Conservation and Management Plan

1. The Water Conservation and Management Plan (WCMP) submitted in the application received June 30, 2014 and subsequently amended and then approved by the Department is incorporated by reference into this permit and shall have the same effect as any condition contained in this permit and may be enforced as such.

2. By the end of the first year of the permit cycle [*date*] the Permittee shall submit documentation to the Department that the leak detection and repair program defined in the WCMP has been initiated. This documentation shall include activities completed during the first year of the permit term. 9VAC25-610-100 B

3. As soon as completed but not later than the end of the second year of the permit cycle [*date*] the Permittee shall submit to the Department results of an audit of the total amount of groundwater used in the distribution system and operational processes. This documentation shall include any resulting changes to the leak detection and repair program in the WCMP. 9VAC25-610-100 B

4. A report on the plan's effectiveness in reducing water use, including revisions to those elements of

the WCMP that can be improved and addition of other elements found to be effective based on operations to date shall be submitted by the end of years four [*date*] and eight [*date*] of the permit term. These reports shall include as appropriate: 9VAC25-610-140 C

a. Any new water saving equipment installed or water saving processes adopted;

b. WCMP actions taken to reduce the volume of water needed to supply the system;

c. Planned short or long term efforts and actions to be added to the WCMP to improve the efficiency of water use in the system or by customers and for reducing the loss of water;

d. Results of additional water audits completed;

e. Review of water use category (residential, commercial, industrial) per-connection use in municipal systems;

f. Evaluation of the leak detection and repair program;

g. Description of educational activities completed; and

h. Identification of any water reuse opportunities identified.

5. If revisions or additions to the plan are necessary, an updated WCMP shall be submitted to the Department for approval along with the report prior to implementation of the revised plan

6. Records of activities conducted pursuant to the WCMP are to be submitted to DEQ upon request.

F. Mitigation Plan

The Mitigation Plan approved on March 8, 2021 by the Department is incorporated by reference into this permit and shall have the same effect as any condition contained in this permit and may be enforced as such. 9VAC25-610-110 D 3 g

G. Well Tags

1. Each well that is included in this permit shall have affixed to the well casing, in a prominent place, a permanent well identification plate that records, at a minimum, the DEQ well identification number, the groundwater withdrawal permit number, the total depth of the well, and the screened intervals in the well. Such well identification plates shall be in a format specified by the Board and are available from the Department. 9VAC25-610-140 A 12

2. Well tags shall be affixed to the appropriate well casing within 30 days of receiving the tags from the Department. The accompanying well tag installation certification form shall be returned to the Department within 60 days of receipt of the tags. 9VAC25-610-140 C

Part II
Special Conditions

Pursuant to 9VAC25-610-140 B and C, the following Special Conditions apply to this permit in order to protect the public welfare, safety, and health or conserve, protect and help ensure the beneficial use of groundwater.

Water Conservation and Management Plan

By the end of 5 years of the permit term [Month Day, 2026], the Permittee shall submit an updated Water Conservation and Management Plan meeting the requirements of 9VAC25-610-100 for approval by the Department. The Plan shall incorporate findings from any water use audits or reports conducted by the permittee, including a timeline for implementing additional water saving measures. Once the plan is approved by the Department, the revised Plan will be incorporated into the permit as a permit condition (replacing the current Plan).

Part III
General Conditions

A. Duty to Comply

The Permittee shall comply with all conditions of the permit. Nothing in this permit shall be construed to relieve the permit holder of the duty to comply with all applicable federal and state statutes, regulations and prohibitions. Any permit violation is a violation of the law and is grounds for enforcement action, permit termination, revocation, modification, or denial of a permit application. 9VAC25-610-130 A

B. Duty to Cease or Confine Activity

It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the activity for which a permit has been granted in order to maintain compliance with the conditions of the permit. 9VAC25-610-130 B

C. Duty to Mitigate

The Permittee shall take all reasonable steps to avoid all adverse impacts that may result from this withdrawal as defined in 9VAC25-610-10 and provide mitigation of the adverse impact when necessary as described in 9VAC25-610-110 D 3 g and 9VAC25-610-130 C.

D. Inspection, Entry, and Information Requests

Upon presentation of credentials, the Permittee shall allow the Board, the Department, or any duly authorized agent of the Board, at reasonable times and under reasonable circumstances, to enter upon the Permittee's property, public or private, and have access to, inspect and copy any records that must be kept as part of the permit conditions, and to inspect any facilities, well(s), water supply system, operations, or practices (including sampling, monitoring and withdrawal) regulated or required under the permit. For the purpose of this section, the time for inspection shall be deemed reasonable during regular

business hours. Nothing contained herein shall make an inspection time unreasonable during an emergency. 9VAC25-610-130 D

E. Duty to Provide Information

The Permittee shall furnish to the Board or Department, within a reasonable time, any information that the Board may request to determine whether cause exists for modifying or revoking, reissuing, or terminating the permit, or to determine compliance with the permit. The Permittee shall also furnish to the Board or Department, upon request, copies of records required to be kept by regulation or this permit. 9VAC25-610-130 E

F. Monitoring and Records Requirements

1. The Permittee shall maintain a copy of the permit on-site and/or shall make the permit available upon request. 9VAC25-610-130 E

2. Monitoring of parameters shall be conducted according to approved analytical methods as specified in the permit. 9VAC25-610-130 F 1

3. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. 9VAC25-610-130 F 2

4. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart or electronic recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit, for a period of at least three years from the date of the expiration of a granted permit. This period may be extended by request of the Board at any time. 9VAC25-610-130 F 3

5. Records of monitoring information shall include as appropriate: 9VAC25-610-130 F 4

    a. the date, exact place and time of sampling or measurements;

    b. the name(s) of the individual(s) who performed the sampling or measurements;

    c. the date the analyses were performed;

    d. the name(s) of the individual(s) who performed the analyses;

    e. the analytical techniques or methods supporting the information, such as observations, readings, calculations and bench data used;

    f. the results of such analyses; and

    g. chain of custody documentation.

G. Environmental Laboratory Certification

The Permittee shall comply with the requirement for certification of laboratories conducting any tests, analyses, measurements, or monitoring required pursuant to the State Water Control Law (§ 62.1-44.2 et seq. of the Code of Virginia), Environmental Laboratory Certification Program (§ 2.2-1105 et seq. of the Code of Virginia), Certification for Noncommercial Environmental Laboratories (1VAC30-45), and/or Accreditation for Commercial Environmental Laboratories (1VAC30-46), and

a. Ensure that all samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

b. Conduct monitoring according to procedures approved under 40CFR Part 136 or alternative methods approved by the U.S. Environmental Protection Agency.

c. Periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals that will ensure accuracy of measurements. 1VAC30-45-20

H. Future Permitting Actions

1. A permit may be modified or revoked as set forth in Part VI of the Groundwater Withdrawal Regulations. 9VAC25-610-290 and 9VAC25-610-130 G

2. If a Permittee files a request for permit modification or revocation, or files a notification of planned changes, or anticipated noncompliance, the permit terms and conditions shall remain effective until the Board makes a final case decision. This provision shall not be used to extend the expiration date of the effective permit. 9VAC25-610-130 G

3. Permits may be modified or revoked upon the request of the Permittee, or upon Board initiative, to reflect the requirements of any changes in the statutes or regulations. 9VAC25-610-130 G

4. The Permittee shall schedule a meeting with the Department prior to submitting a new, expanded or modified permit application. 9VAC25-610-85

5. A new permit application shall be submitted 270 days prior to the expiration date of this permit, unless permission for a later date has been granted by the Board, to continue a withdrawal greater than or equal to 300,000 gallons in any month while an application for a renewal is being processed. 9VAC25-610-96

6. A new permit application shall be submitted 270 days prior to any proposed modification to this permit that will (i) result in an increase of withdrawal above permitted limits; or (ii) violate the terms and conditions of this permit. 9VAC25-610-96

7. The applicant shall provide all information described in 9VAC25-610-94 for any reapplication. 9VAC25-610-96 C

8. The Permittee must notify the Department in writing of any changes to owner and facility contact information within 30 days of the change. 9VAC25-610-140 C

I. Metering and Equipment Requirements

1. Each well and/or impoundment or impoundment system shall have an in-line totalizing flow meter to read gallons, cubic feet, or cubic meters installed prior to beginning the permitted use. Meters shall produce volume determinations within plus or minus 10% of actual flows. 9VAC25-610-140 A 7 b

    a. A defective meter or other device must be repaired or replaced within 30 days.

    b. A defective meter is not grounds for not reporting withdrawals. During any period when a meter is defective, generally accepted engineering methods shall be used to estimate withdrawals. The period during which the meter was defective must be clearly identified in the groundwater withdrawal report required by Part I, Subsection D of this permit. An alternative method for determining flow may be approved by the Board on a case-by-case basis.

2. Each well shall be equipped in a manner such that water levels can be measured during pumping and non-pumping periods without dismantling any equipment. Any opening for tape measurement of water levels shall have an inside diameter of at least 0.5 inches and be sealed by a removable plug or cap. The Permittee shall provide a tap for taking raw water samples from each permitted well. 9VAC25-610-140 A 7 e

J. Minor Modifications

1. A minor modification to this permit must be made to replace an existing well(s) or add an additional well(s) provided that the well(s) is screened in the same aquifer(s) as the existing well(s), and is in the near vicinity of the existing well(s), the total groundwater withdrawal does not increase, the area of impact does not increase, and the well has been approved by the Department prior to construction. 9VAC25-610-330 B 4 and B 5

2. A minor modification to this permit must be made to combine withdrawals governed by multiple permits when the systems are physically connected as long as interconnection will not result in additional groundwater withdrawal and the area of impact will not increase. 9VAC25-610-330 B 6

3. Minor modifications to this permit must also be made to:

    a. Change an interim compliance date up to 120 days from the original compliance date, as long as the change does not interfere with the final compliance date. 9VAC25-610-330 B 7

    b. Allow for change in ownership when the Board determines no other change in the permit is necessary and the appropriate written agreements are provided in accordance with the transferability of permits and special exceptions. 9VAC25-610-320 and 9VAC25-610-330 B 8

    c. Revise a Water Conservation and Management Plan to update conservation measures being implemented by the Permittee that increase the amount of groundwater conserved. 9VAC25-610-330 B 9

K. Well Construction

At least two weeks prior to the scheduled construction of any well(s), the Permittee shall notify the Department of the construction timetable and receive prior approval of the well(s) location(s) and acquire the DEQ Well number. All wells shall be constructed in accordance with the following requirements.

1. A well site approval letter or well construction permit must be obtained from the Virginia Department of Health prior to construction of the well. 9VAC25-610-130 A

2. A complete suite of geophysical logs (16"/64" Normal, Single Point, Self-Potential, Lateral, and Natural Gamma) shall be completed for the well and submitted to the Department along with the corresponding completion report. 9VAC25-610-140 C

3. The Permittee shall evaluate the geophysical log and driller's log information to estimate the top of the target aquifer and; therefore, a depth below which the pump shall not be set. The Permittee's determination of the top of the target aquifer shall be submitted to the Department for review and approval, or approved on site by the Department's Groundwater Characterization staff, prior to installation of any pump. 9VAC25-610-140 A 6

4. The Permittee shall install gravel packs and grout in a manner that prevents leakance between aquifers. Gravel pack shall be terminated close to the top of the well screen(s) and shall not extend above the top of the target aquifer. 9VAC25-610-140 C

5. A completed GW-2 Form and any additional water well construction documents shall be submitted to the Department within 30 days of the completion of any well and prior to the initiation of any withdrawal from the well. The assigned DEQ Well number shall be included on all well documents. 9VAC25-610-140 C

6. In addition to the above requirements, if required by the permit, construction of a Water Level Monitoring State Observation Well (SOW) requires:

    a. The Permittee shall coordinate activities with the Department's Groundwater Characterization Program (GWCP) to determine the appropriate observation well location and construction schedule, along with the needed screen interval(s), and other completion details following review of geophysical logging. 9VAC25-610-140 C

    b. Prior to preparation of bid documents for construction of the observation well, the Permittee shall notify the Department and shall include any GWCP requirements in the bid documents. At a minimum, the Department will require a pre-bid meeting with interested drilling contractors and a pre-construction meeting with the successful bidder. 9VAC25-610-140 C

    c. Instrumentation to meet the requirements for real-time data transmission consistent with the State Observation Well Network shall be purchased by the Permittee. The Permittee shall submit a purchase order based on the Department's equipment specifications for review and approval prior to purchase of the equipment. The Permittee shall install the real-time equipment infrastructure with Department oversight. The Department will conduct the

installation of the transducer and final hook-up of the equipment. 9VAC25-610-140 C

7. In addition to the above requirements, if required by the permit, construction of a Chloride Monitoring SOW requires:

    a. The Permittee shall coordinate activities with the Department's Groundwater Characterization Program (GWCP) to determine the appropriate observation well location and construction schedule, along with the needed screen interval(s), and other completion details following review of geophysical logging. 9VAC25-610-140 C

    b. Prior to preparation of bid documents for construction of the observation well, the Permittee shall notify the Department and shall include any GWCP requirements in the bid documents. At a minimum, the Department will require a pre-bid meeting with interested drilling contractors and a pre-construction meeting with the successful bidder. 9VAC25-610-140 C

    c. Instrumentation to meet the requirements for real-time data transmission consistent with the State Observation Well Network shall be purchased by the Permittee. The Permittee shall submit a purchase order based on the Department's equipment specifications for review and approval prior to purchase of the equipment. The Permittee shall install the real-time equipment infrastructure with Department oversight. The Department will conduct final hook-up of the equipment. 9VAC25-610-140 C

    d. Instrumentation to meet the requirements for continuous measurement of specific conductance from multiple levels within the well screen shall be purchased by the Permittee. The Permittee shall submit a purchase order based on the Department's equipment specifications for review and approval prior to purchase of the equipment. The Permittee shall install the real-time equipment infrastructure with Department oversight. The Department will conduct the final hook-up of the equipment. 9VAC25-610-140 C

L. Permit Reopening

This permit may be reopened for the purpose of modifying the conditions of the permit as follows:

a. To meet new regulatory standards duly adopted by the Board. 9VAC25-610-140 A 11

b. When new information becomes available about the permitted withdrawal, or the impact of the withdrawal, which had not been available at permit issuance and would have justified the application of different conditions at the time of issuance. 9VAC25-610-310 B 1

c. When the reported withdrawal is less than 60% of the permitted withdrawal amount for a five year period. 9VAC25-610-310 B 2

d. If monitoring information indicates the potential for adverse impacts to groundwater quality or level due to this withdrawal. 9VAC25-610-140 C

COMMONWEALTH of VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY

DRAFT PERMIT ISSUANCE FACT SHEET

Groundwater Withdrawal Permit Number: GW0038700
Application Date: June 30, 2014

The Department of Environmental Quality (Department or DEQ) has reviewed the application for a Groundwater Withdrawal Permit. Based on the information provided in the application and subsequent revisions, DEQ has determined that there is a reasonable assurance that the activity authorized by the permit is a beneficial use as defined by the regulations. Groundwater impacts have been minimized to the maximum extent practicable. The following details the application review process and summarizes relevant information for developing the Permit and applicable conditions.

Permittee / Legal Responsible Party

Name & Address: Northampton County
16404 Courthouse Road, P.O. Box 66
Eastville, VA 23347
Phone: (757) 678-0414

Facility Name and Address

Name & Address: Bayview Community
22273 Laughing Gull Rd.
Cape Charles, VA 23310
Phone: N/A

Contact Information:

Name: Chris Thomas
E-mail: cthomas@co.northampton.va.us
Phone: (757) 678-3377

Proposed Beneficial Use Type:

The permitted withdrawal will be used to support the water demand of a residential housing community as a non-municipal public water supply.

Processing Dates

Processing Action	Date Occurred/Received
Notification of Renewal:	Not applicable
Pre-Application Meeting:	February 7, 2013
Application Received by DEQ-OWS:	June 30, 2014
Permit Fee Deposited by Accounting:	July 23, 2014
Application Review Conducted:	February 28, 2013
Notice of Deficiency Sent	N/A
Request for Additional Information Sent:	August 14, 2014
Response to Request for Additional Information Received:	October 24, 2014
Local Government Ordinance Form Received by DEQ-OWS:	August 12, 2014
Application Complete:	March 8, 2021
Submit Request for Technical Evaluation:	December 30, 2015
Technical Evaluation Received by DEQ-OWS:	February 1, 2016
Submit Request for Revised Technical Evaluation:	April 12, 2021
Revised Technical Evaluation Received by DEQ-OWS:	April 28, 2021
Draft Permit Package Sent:	October 6, 2021
Submit Draft Permit for Public Notice:	Pending
Public Notice Published:	Pending
End of 30-Day Public Comment Period:	Pending
Response to Public comment:	Pending
Public Meeting or Hearing:	Pending

Application

Application Information

Description and History:

Background / Purpose of Facility:
The Bayview Community is a residential housing re-development that has not been previously permitted. It consists of apartment, townhome, duplex, and single-family homes that are all managed both the Bayview Citizens for Social Justice and individual residents. The water system itself is owned by Northampton County, operating through the Department of Public Works. The water system was originally installed by the U.S. Department of Housing and Urban Development in 2003. Northampton County took over the system's operations in 2009 and assumed ownership in 2014. The County worked with the Virginia Department of Health and the U.S. Department of Housing and Urban Development to complete necessary construction of an atmospheric ground storage tank in order to qualify for a Waterworks Operations Permit, which was issued on May 27, 2014 for 43,432 gallons per day (gal/day).

Water is withdrawn from two production wells on-site: North #2 (DEQ Well No. 165-00399) and South #1 (DEQ Well No. 165-00400) located approximately 60 ft apart from each other. A geophysical log was collected for each well in December 2000 by Sydnor Utilities, Inc. Both wells were completed in January 2001 by Bundick Well and Pump, drilled to a total depth of 260 feet below land surface (ft/bls). Both wells are screened in the Middle Yorktown-Eastover aquifer at 205-235 ft/bls with pump intakes set 190 ft/bls (see Part I below). There are no other known wells located on the property.

Location of Facility/Withdrawal:

Water Supply Planning Unit: Accomack and Northampton

County: Northampton

GWMA/Aquifer: Eastern Shore/Yorktown-Eastover

Conjunctive Use Source: No conjunctive use

Withdrawal Use, Current Need, and Projected Demand:

Basis of Need: Bayview Community's groundwater withdrawal is intended to support the potable water demands for the current and future residences of the facility. The facility has the capacity to add up to 30 additional connections, which would consist of 28 residential connections, a community center, and a daycare center. The facility's withdrawals remain consistent throughout the year with no significant seasonal fluctuation. All of the water withdrawn is intended for human consumptive use, and none is used for irrigation purposes.

Water Demand and Projections: Bayview Community currently has 72 active connections (71 residences and one laundromat) with 19 vacant lots remaining available for total buildout. Within these 19 lots, there are 30 additional planned connections that include 28 residences (single-family, duplex, and/or triplex homes), a community center, and a day care center. The applicant initially used the daily water withdrawal limit assigned by the VDH to project monthly and annual withdrawal requests. These amounts were 43,432 gallons per day (the permitted amount under Waterworks Operation Permit No. 3131061), 1,321,057 gallons per month (gal/mo), and 15,852,680 gallons per year (gal/yr). Upon consultation with DEQ and evaluation of the facility's needs based on historic, current, and future use, the applicant submitted the final revised withdrawal request of 24,000 gallons per day (gal/day), 750,000 gal/mo and 5,010,000 gal/yr via email correspondence dated March 8, 2021.The summary of this evaluation is described below:

At the time of application submission, the applicant provided records from March 2006 through April 2014. Data from the highest water withdrawal year (2011) was analyzed, with the highest monthly withdrawal occurring in April at 617,169 gal and a total annual withdrawal volume of 3,651,968 gal. This data was then used to calculate the total future connection demand by applying the maximum monthly withdrawal at 72 connections to the potential maximum monthly withdrawal at total buildout, as shown in the calculations below:

Projected Maximum Monthly Withdrawal:

$$\frac{617{,}169\ gal}{72\ connections} = 8{,}572 \text{ gal per connection}$$

Projected connections at total buildout = 102

8,572 gal/connection/month x 102 connections = 874,344, rounded to 875,000 gal per month

Additional water withdrawal data was provided for the complete years of 2018-2020. This more recent data showed the maximum monthly withdrawal was 585,433 gallons (April 2018) and the maximum annual was 6,101,783 gallons (2018). The higher annual usage in 2018 was attributed to several leaks in residential plumbing fixtures (sinks, toilets, etc.). In order to mitigate these leaks, the community billing system was switched from a flat-rate to one based on water use at each connection. This incentivized residents to pursue the necessary repairs for water conservation. After these changes were made, the facility's water use returned to a similar average seen in the initial data set provided (2006-2014). According to the more recent data (2019-2020), the average maximum month for this more recent data is 585,433 gal and the average annual use is 4,523,567 gal.

The projected connection increase from current operations to total buildout is 41.66%. This percent increase was applied to the data for existing connections in order to obtain the daily, monthly, and annual withdrawals at total buildout. Since data from 2018 experienced unusually high water use no longer representative of the facility, values from the most recent representative year (2020) were used as a basis for these calculations. The current, future, and final rounded-up values are shown in the table below:

Table 1: Water Demand Projections at Total Buildout (Based on 2020 Withdrawal Data)

	Existing (72 Connections)	**Total Buildout (102 Connections: 41.66% Increase)**	**Final Rounded Amount**
Maximum Monthly	521,045 gal	738,147 gal	750,000 gal*
Maximum Annual	3,536,140 gal	5,009,532 gal	5,010,000 gal

*The monthly maximum was rounded approximately 1.60% higher (while the other amounts were rounded up less than 1%) in order to accommodate additional fluctuation in peak season months.

According to this data, the current withdrawal per connection per day is approximately 135 gal. This value remains consistent with the projected annual withdrawal amount at total buildout. These calculations are shown below:

Daily Water Use Per Connection (Current):

Total annual withdrawal in 2020 = 3,536,140 gal

$$\frac{3{,}563{,}140\ gal}{365\ days} = 9{,}688 \text{ gal/day}$$

$$\frac{9{,}688\ gal\ per\ day}{72\ connections} = 135 \text{ gal/connection/day}$$

Daily Water Use Per Connection (Total Buildout):

Total projected annual withdrawal = 5,009,532

$$\frac{5{,}009{,}532\ gal}{365\ days} = 13{,}725 \text{ gal/day}$$

$$\frac{13{,}725\ gal\ per\ day}{102\ connections} = 135 \text{ gal/connection/day}$$

Based on the data presented above in Table 1, the applicant revised their requested maximum withdrawal amounts to be 750,000 gal/mo and 5,010,000 gal/yr. When compared to the original requested withdrawal amounts submitted with the application on June 30, 2014, these revised values represent approximately 43%, and 68% decrease in withdrawal requests, respectively, while sufficiently accounting for the current and future water demand for the facility.

Withdrawal Volumes Requested: The applicant requested the following withdrawal volumes based upon the projected groundwater demand demonstrated in the above section.

Period of Withdrawal	Total Volume (gal)	Volume in gal/day
Maximum Monthly:	750,000	25,000
Maximum Annual:	5,010,000	13,726

DEQ Evaluation

Historic Withdrawals: Northampton County used historic withdrawal data at the time of application submission, dating from 2006-2014, and is referred to in Table 2 below as "Data Set 1". On March 8, 2021 DEQ received the complete set of withdrawal data for years 2018-2020. According to this more recent data set (referred to in Table 2 below as "Data Set 2") the maximum withdrawals were 585,433 gal/mo and 6,101,783 gal/yr. This data represents the current water demand of the 72 existing connections of Bayview Community's public water supply.

Table 2: Summary of Historic Groundwater Withdrawal Data for Bayview Community

	Highest Monthly Amount	Average Monthly Amount	Highest Annual Amount	Average Annual Amount
Data Set 1 (2006-2014)	617,169 gal (April 2011)	285,893 gal	3,651,968 gal (2011)	3,148,413 gal
Data Set 2 (2018- 2020)	585,433 gal (April 2018)	376,964 gal	6,101,783 gal (2018)	4,523,567 gal

The historic data presented above provides a basis of support in the justification of the demand projections for the facility at future total buildout.

Analysis of Alternative Water Supplies: Due to the location and regional geography of the Eastern Shore, there are no sources of surface water of sufficient quality or quantity to meet the facility's proposed beneficial use demand. The Bayview system accounts for one of the only four municipal public water supply systems currently located in Northampton County, the other three are not close enough to be viable options for use (Town of Exmore is approximately 20.2 miles away, Town of Eastville is approximately 6.2 miles away, and Cape Charles Waterworks is approximately 2.4 miles away). All public water supplies in this area rely on the Yorktown-Eastover aquifer generally, and there are no nearby existing service areas that serve as are practicable alternatives currently.

The Columbia Aquifer would not reasonably have been expected be able to support the water quantity or quality demands for this facility at the time of construction. It is currently unknown if a water withdrawal from the Columbia aquifer would require additional treatment prior to use as a potable water source, and costly investigation would be necessary to determine if the Columbia aquifer could supply all or part of the potable water supply needed and address any additional treatment required.

Public Water Supply: The municipal public water supply consists of two wells, a 15,000-gallon ground storage tank, a 5,000-gallon hydropneumatic tank, two transfer pumps, and a distribution system. The Virginia Department of Health issued a Waterworks Operations Permit No. 3131061 on May 27, 2014 as a Class VI community waterworks system with the design capacity of 43,432 gallons per day. The limiting factor in this system is the storage.

Water Supply Plan Review: The Bayview Community was included in the Northampton County and Towns Water Supply Plan (Plan) with expansion plans throughout the planning period that remain consistent with the facility's buildout timeline. The requested withdrawal amount would be sufficient to meet demands over the planning period for the facility. No current alternatives were noted as available, as Northampton County relies on groundwater as a sole source of supply.

Department Recommended Withdrawal Limits: DEQ reviewed the requested limits and found the calculations and supporting documentation sufficient as a basis for the request. DEQ recommended the following withdrawal volumes based on the evaluation of the groundwater withdrawal permit application, historic water withdrawal data, and additional supplemental information provided by the applicant. The requested maximum annual withdrawal amount was rounded up to the nearest hundred-thousand amount in accordance with DEQ's April 6, 2015 "Rounding Memo", which resulted in the following increase to 5,100,000 gal. These represent an approximate 1.8% increase from the applicant's final requested amount.

Period of Withdrawal	Total Volume (gal.)	Volume in gal/day
Maximum Monthly:	750,000	25,000
Maximum Annual:	5,100,000	13,972

Technical Evaluation: Aquaveo performed a technical evaluation of the application for the Department based on the VAHydroGW-ES model. A surrogate aquifer test performed at a nearby location and the resulting data was used as a reference in the evaluation. The objectives of this evaluation were to determine the areas of any aquifers that will experience at least one foot of water level decline due to the

proposed withdrawal (the Area of Impact or AOI), to determine the potential for the proposed withdrawal to cause salt-water intrusion, and to determine if the proposed withdrawal meets the 80% drawdown criteria. The full technical evaluation is attached to this fact sheet as Attachment I.

Department staff concluded that the withdrawal requested by Northampton County for the Bayview Community withdrawal satisfies the technical evaluation criteria for permit issuance. The AOIs for the Upper, Middle, and Lower Yorktown-Eastover aquifers are provided in Attachment I.

Part I
Operating Conditions

Authorized Withdrawals:

Owner Well Name	DEQ Well #	Aquifer	Type	Pump Intake Limit (ft. bls)
North #2	165-00399	Middle Yorktown-Eastover	Production	200
South #1	165-00400	Middle Yorktown-Eastover	Production	200

Apportionment:

The apportionment for North #2 (DEQ Well No. 165-00399) and South #1 (DEQ Well No. 165-00400) is equally distributed.

Additional Wells:

Observation Wells: There are no observation wells associated with this facility.

Abandoned Wells: There are no abandoned wells associated with this facility.

Out of Service Wells: There are no out of service wells associated with this facility.

Pump Intake Settings: Based on the Department's evaluation of the geophysical logs and soil cuttings from North #2 and South #1 wells, the top and bottom of the Middle Yorktown-Eastover aquifer are 200 ft/bls and 240 ft/bls, respectively. Both wells are screened in the Middle Yorktown-Eastover aquifer. Pump intake settings were verified by Bundick Well & Pump on January 28, 2015 at 190 ft/bls. Both pumps are correctly positioned above the top of the Middle Yorktown-Eastover aquifer in accordance with 9VAC25-610-140 A 6.

Withdrawal Reporting: Groundwater withdrawals are to be recorded monthly and reported quarterly.

Water Conservation and Management Plan:

A Water Conservation and Management Plan (WCMP) meeting the requirements of 9VAC25-610-100 B was submitted and reviewed as part of the application process. The accepted Plan is to be followed by the permittee as an operational Plan for the facility/water system, is incorporated by reference into this permit, and shall have the same effect as any condition contained in this permit and may be enforced as

such (Attachment 2). In addition, the permit includes conditions requiring a leak detection and repair program that includes the following:

- Documentation that the leak detection and repair program defined in the WCMP has been initiated is due by the end of the first year of the permit term.
- A result of an audit of the total amount of groundwater used in the distribution system and operational processes is due by the end of the second year of the permit term.
- A report on the plan's effectiveness in reducing water use, including revisions to those elements of the WCMP that can be improved and addition of other elements found to be effective based on operations to date shall be submitted by the end of years four[*MM DD 2025*] and eight [*MM DD 2029*] of the permit term. These reports shall include as appropriate: 9VAC25-610-140 C

  a. Water-saving plumbing and processes to decrease the amount of water withdrawn or to decrease water demand, including the specific types(s) of irrigation systems in place, irrigation schedules used to minimize water demand, and crop watering requirements;
  b. Any new water saving equipment installed or water saving processes adopted should be described;

  c. A status update on the success of the water loss reduction program and status of the leak detection and repair program based on the results of the water audit, including a description of actions taken to reduce the volume of water needed to supply the system;

  d. The water use education program, including any revisions or improvements made to employee training on water conservation in relation to the irrigation management plan;

  e. An evaluation of current potential water reuse options, including the potential for expansion of existing reuse practices and/or adoption of additional reuse practices;

  f. Requirements for mandatory water use reductions during water shortage emergencies and compliance with drought response and contingency ordinances or other ordinances that prohibit the use of water; and

  g. Any portions of agricultural or irrigation management plans developed to demonstrate compliance with the above items.

Mitigation Plan:

The predicted AOI resulting from the Technical Evaluation extends beyond the property boundaries in the Upper, Middle, and Lower Yorktown-Eastover aquifers. A Mitigation Plan to address potential claims from existing well owners within the predicted area of impact is incorporated by reference into this permit and shall have the same effect as any condition contained in this permit and may be enforced as such (Attachment 3).

Well Tags: Well tags will be transmitted by DEQ after issuance of the final permit.

Part II
Special Conditions

With the exception of the condition listed below, the review of the applicant's application, well construction data, operations at the facility, and the Technical Evaluation of the application did not identify a need for water quality or water level monitoring, pump intake reset, or well abandonment conditions in the permit. There are no new wells currently planned for construction during the permit term. Technical Evaluation of the application considered a nearby surrogate aquifer test and additional testing is not required at this facility. Construction of observation wells or well nests, and geophysical boreholes to assist in monitoring or characterizing the local or regional aquifer system are not required at this time.

Water Conservation and Management Plan: By the end of five years of the permit term [Month Day, 2026], the Permittee shall submit an updated Water Conservation and Management Plan meeting the requirements of 9VAC25-610-100 for approval by the Department. The Plan shall incorporate findings from any water use audits or reports conducted by the permittee, including a timeline for implementing additional water saving measures. Once the plan is approved by the Department, the revised Plan will be incorporated into the permit as a permit condition (replacing the current Plan).

Part III
General Conditions

General Conditions are applied to all Groundwater Withdrawal Permits, as stated in the Groundwater Withdrawal Regulations, 9VAC25-610-10.

Public Comment

The following sections will be completed after close of the public comment period.

Relevant Regulatory Agency Comments:

Summary of VDH Comments and Actions: Pending

Public Involvement during Application Process:

Local and Area wide Planning Requirements: The Northampton County Administrator certified that there are no local ordinances in effect. DEQ received this certification on June 21, 2021.

Public Comment/Meetings:

The public notice was published in xxxxxx on XXX. The public comment period ran from xxxxx to xxxxx

Changes in Permit Part II Due to Public Comments

Changes in Permit Part III Due to Public Comments

Staff Findings and Recommendations

Based on review of the permit application, staff provides the following findings.

- The proposed activity is consistent with the provisions of the Ground Water Management Act of 1992, and will protect other beneficial uses.
- The proposed permit addresses minimization of the amount of groundwater needed to provide the intended beneficial use.
- The effect of the impact will not cause or contribute to significant impairment of state waters.
- This permit includes a plan to mitigate adverse impacts on existing groundwater users.
- The draft permit reflects the required consultation with and full consideration of the written recommendations of VDH.

Staff recommends Groundwater Withdrawal Permit Number GW0038700 be issued as proposed.

Attachments

1. **Technical Evaluation**
2. **Water Conservation and Management Plan**
3. **Mitigation Plan**
4. **Public Comment Sheet (if needed)**

Approved: _____
Director, Office of Water Supply

Date: _____

COMMONWEALTH of VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY

TECHNICAL EVALUATION FOR PROPOSED GROUNDWATER WITHDRAWAL

Date: April 9, 2021

Application /Permit Number: GW0038700

Owner / Applicant Name: Northampton County

Facility / System Name: Bayview Community

Facility Type: Non-municipal Public Water Supply

Facility / System Location: Northampton County

The Commonwealth of Virginia's Groundwater Withdrawal Regulations (9VAC25-610) provide that, for a permit to be issued for a new withdrawal, to expand an existing withdrawal, or reapply for a current withdrawal, a technical evaluation shall be conducted. This report documents the results of the technical evaluation conducted to meet the requirements for the issuance of a permit to withdraw groundwater within a Designated Groundwater Management Area (9VAC25-600).

This evaluation determines the:

(1) The Area of Impact (AOI): The AOI for an aquifer is the areal extent of each aquifer where one foot or more of drawdown is predicted to occur as a result of the proposed withdrawal.
(2) Water Quality: The potential for the proposed withdrawal to cause salt water intrusion into any portion of any aquifers or the movement of waters of lower quality into areas where such movement would result in adverse impacts on existing groundwater users or the groundwater resource.
(3) The Eighty Percent Drawdown (80% Drawdown): The proposed withdrawal in combination with all existing lawful withdrawals will not lower water levels, in any confined aquifer that the withdrawal impacts, below a point that represents 80% of the distance between the land surface and the top of the aquifer at the points where the one-foot drawdown contour is predicted for the proposed withdrawal.

Requested maximum withdrawal amounts:

Requested Withdrawal Amount	
Annual Value	5,100,000 gallons (13,972 average gal/d)
Monthly Value	750,000 gallons (25,000 average gal/d)
Daily Value	24,000 gallons

Summary of Requested Withdrawal:
The requested withdrawal is to support the water needs of a non-municipal housing re-development that has not been previously permitted.

Requested Apportionment of Withdrawal:

DEQ Well #	**Owner Well #**	**Aquifer**	**Percent of Withdrawal**
165-00400	Well #1 (South Well)	Middle Yorktown-Eastover	50
165-00399	Well #2 (North Well)	Middle Yorktown-Eastover	50

Production Well(s):

Identification	Location	Construction	Pump Intake	Source Aquifer
Owner Well Name: Well #1 (South Well) DEQ Well Number: 165-00400 MPID: 371626075575202	Lat: : 37° 16' 25.8" Lon: 75° 57' 51.8" Datum : NAD 27 Elevation: 30 ft	Completion Date: 01/12/2001 Screens (ft/bls): 205-235 Total Depth (ft/bls): 260	190 ft/bls	Middle Yorktown-Eastover
Owner Well Name: Well #2 (North Well) DEQ Well Number: 165-00399 MPID: 371626075575201	Lat: : 37° 16' 26.1" Lon: 75° 57' 51.8" Datum : NAD 27 Elevation: 30 ft	Completion Date: 01/03/2001 Screens (ft/bls): 205-235 Total Depth (ft/bls):260	190 ft/bls	Middle Yorktown-Eastover

Out of Service/Abandoned Well(s): None

Well(s)to be Abandoned: None

Observation Wells: None

Geologic Setting:
The Bayview Community wells (applicant wells) are located in Northampton County. The production wells are screened in the Middle Yorktown-Eastover aquifer. The upper portion of the Yorktown-Eastover aquifer (described in the 2006 Virginia Coastal Plain Hydrologic Framework[1] (VCPHF) as a combination of the Upper, Middle, and Lower Yorktown-Eastover aquifers) is composed primarily of estuarine to marine quartz sands of the Yorktown Formation of Pliocene age. The nearest USGS geologic cross section found in the USGS Scientific Investigations Report 2019-5093 is cross-section A-A' (see attached figure at the end of the report) [2].

Virginia Eastern Shore Model data:
The following table lists the locations of the applicant production wells within the Virginia Eastern Shore Model[3] (VAHydroGW-ES).

VAHydroGW-ES Model Grid				
Well	**Well Number**	**MPID**	**Row**	**Column**
Well #1 (South Well)	165-00400	371626075575202	313	44
Well #2 (North Well)	165-00399	371626075575201	313	44

[1] McFarland, E.R., and Bruce, T.S., 2006, The Virginia Coastal Plain Hydrogeologic Framework: U.S. Geological Survey Professional Paper 1731, 118 p., 25 pls.
[2] McFarland, E.R., and Beach, T.A., 2019, Hydrogeologic framework of the Virginia Eastern Shore: U.S. Geological Survey Scientific Investigations Report 2019-5093, 26 p., 13 pl., https://doi.org/10.3133/sir20195093.
[3] Sanford, W.E., Pope, J.P., and Nelms, D.L., 2009, Simulation of groundwater-level and salinity changes in the Eastern Shore, Virginia: U.S. Geological Survey Scientific Investigations Report 2009–5066, 125 p.

Hydrologic Framework:
Data from the VCPHF is reported in this technical report to illustrate the hydrogeologic characteristics of the aquifers in the Virginia Eastern Shore near the applicant wells and identify major discrepancies between regional hydrogeology and site logs interpreted by the DEQ.

The following average aquifer elevations were estimated from the VAHydroGW-ES at the model cell(s) containing the applicant production wells.

VAHydroGW-ES Average Hydrologic Unit Information		
Aquifer	**Elevation (feet msl)**	**Depth (feet bls)**
Surface	33	0
Columbia aquifer (bottom)	-40	73
Upper Yorktown-Eastover aquifer (top)	-99	132
Upper Yorktown-Eastover aquifer (bottom)	-141	174
Middle Yorktown-Eastover aquifer (top)	-158	191
Middle Yorktown-Eastover aquifer (bottom)	-213	246
Lower Yorktown-Eastover aquifer (top)	-249	282
Lower Yorktown-Eastover aquifer (bottom)	-410	443

Groundwater Characterization Program Recommendations:
DEQ has reviewed available information and made the following determinations regarding the location of the aquifer top for the following wells. Information reviewed in this process included GW-2 forms, geophysical logs from both wells, and the Hydrogeologic Framework of the Virginia Eastern Shore (USGS Scientific Investigations Report 2019-5093).

Unit	Well #1 (South Well) (ft/bls)	Well #2 (North Well) (ft/bls)
Top Middle Yorktown-Eastover	200	200
Bottom Middle Yorktown-Eastover	240	240

Comparison of the Hydrogeologic Framework and Groundwater Characterization Program Recommendations:
The top elevation of the Middle Yorktown-Eastover aquifer obtained by DEQ of 200 ft-bls is slightly lower than but in general agreement with the value obtained from the VAHydroGW-ES framework of 191 ft-bls. The bottom elevation of the Middle Yorktown-Eastover aquifer obtained by DEQ of 240 ft-bls is slightly higher than but also in general agreement with the value obtained from the VAHydroGW-ES framework of 246 ft-bls. The thickness of the Middle Yorktown-Eastover aquifer obtained by DEQ of 40 feet is slightly lower but also in general agreement with the thickness from the VAHydroGW-ES framework of 55 feet.

Water Level Comparison:
Below water levels retrieved from the USGS regional observation network wells are compared to the simulated water levels reported in the *Virginia Eastern Shore Model (VAHydroGW-ES) 2019-2020 Simulation of Potentiometric Groundwater Surface Elevations of Reported and Total Permitted Use*

report (the 2019-2020 report) and simulation files.[4] This comparison is made in order to evaluate the performance of the regional model in the vicinity of the applicant wells and assess historical groundwater trends.

The 2019-2020 report provides two sets of simulated potentiometric water surface elevations. The VAHydroGW-ES model is divided into three parts. The first portion of the model simulates water levels within the Eastern Shore aquifers from 1900 through 2019 based upon historically reported pumping amounts (the "*Historic Use Simulation*"). This portion of the model has been calibrated to match water levels observed in USGS regional observation network wells situated throughout the peninsula. The water levels reported in the 2019-2020 report are based upon two separate simulations, each simulation running from 2020 through 2069. The simulated pumping amount in these two simulations are based upon, 1) the average 2015-2019 reported withdrawal amount of wells in the VAHydroGW-ES model (the "R*eported Use Simulation*") and, 2) the current (2020) maximum withdrawal amount allowed under their current permit for wells in the VAHydroGW-ES model (the "*Total Permitted Simulation*"). Both these simulations are an extension of the *Historic Use Simulation* and the water levels reported in the 2019-2020 report are the final water levels simulated at the end of the simulations (2069).

The "VAHydroGW-ES 2069 Reported Use Water Level," reported in the tables below, is the simulated water level – 50 years from present – if all permitted pumping continued at the average 2015-2019 reported withdrawal amount for the next 50 years. The "VAHydroGW-ES 2069 Total Permitted Water Level," reported in the tables below, is the simulated water level – 50 years from present – if all Eastern Shore permitted wells were to pump at the maximum permitted amount allowed under their current permit for the next 50 years. Finally, the "VAHydroGW-ES 2019 Historic Use Water Level," reported in the tables below, is the water level simulated for the year 2019 in the *Historic Use Simulation*.

The nearest USGS regional observation network wells to the applicant wells, completed in the Middle Yorktown-Eastover aquifer, are listed in the following table and shown in Figure 1. For the USGS regional observation network wells, average 2019 reported water levels are shown in the following tables. Simulated water levels for the VAHydroGW-ES cells containing the USGS regional observation network wells are also shown in the following tables.

Comparing the VAHydroGW-ES 2019 Historic Use Water Level with the USGS Network Well 2019 Water Level provides a method for judging the accuracy of the VAHydroGW-ES. Figures 2 and 3 show graphs of the recorded water levels from the USGS observation wells listed in the following tables. These figures also show the simulated VAHydroGW-ES *Historic Use Simulation* water levels for the model cell containing each USGS well. Observing the simulated and observed water elevations together provide a second method for assessing the accuracy of the VAHydroGW-ES in the vicinity of the applicant wells.

[4] See *Virginia Eastern Shore Model 2019-2020 Simulation of Potentiometric Groundwater Surface Elevations of Reported and Total Permitted Use* report and simulation files on file with the VA DEQ.

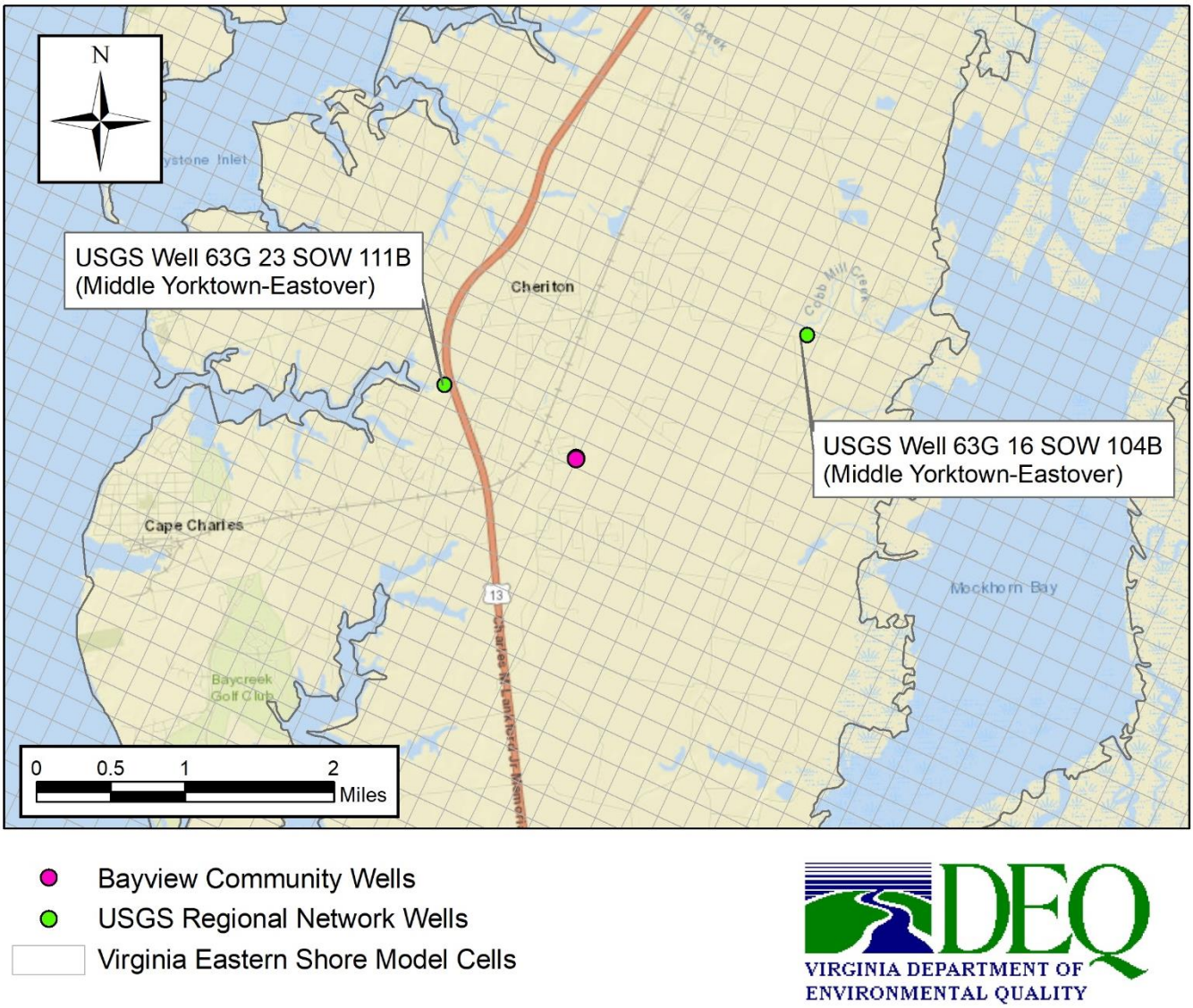


Figure 1. Nearest USGS regional observation network wells.

The Middle Yorktown-Eastover VAHydroGW-ES 2019 Reported Use Water Level is in general agreement with the USGS Network Well 2019 Water Level observed in Well 63G 16 SOW 104B; while the 2019 VAHydroGW-ES water level is generally in agreement, but is a few feet higher than the level observed in Well 63G 23 SOW 111B. Both wells exhibit yearly fluctuations in water levels of approximately 1 to 6 feet. Water levels simulated by the VAHydroGW-ES do not fluctuate in the same manner because the pumping and recharge simulated in the model for any given year are averaged over the year and entered in the model as the average value for the year.

Middle Yorktown-Eastover Measurements	Well 63G 23 SOW 111B	Well 63G 16 SOW 104B
Distance from applicant wells (miles)	1.0	1.7
VAHydroGW-ES Row	313	306
VAHydroGW-ES Column	39	50
VAHydroGW-ES Land Surface Elevation (ft-msl)	10	28
USGS Well Land Surface Elevation (ft-msl)	15	28

USGS Network Well 2019 Water Level (ft-msl)	13.3	15.1
VAHydroGW-ES 2019 Reported Use Water Level (ft-msl)	4.7	11.8
VAHydroGW-ES 2069 Reported Use Water Level (ft-msl)	4.7	11.8
VAHydroGW-ES 2069 Total Permitted Water Level (ft-msl)	3.4	11.6

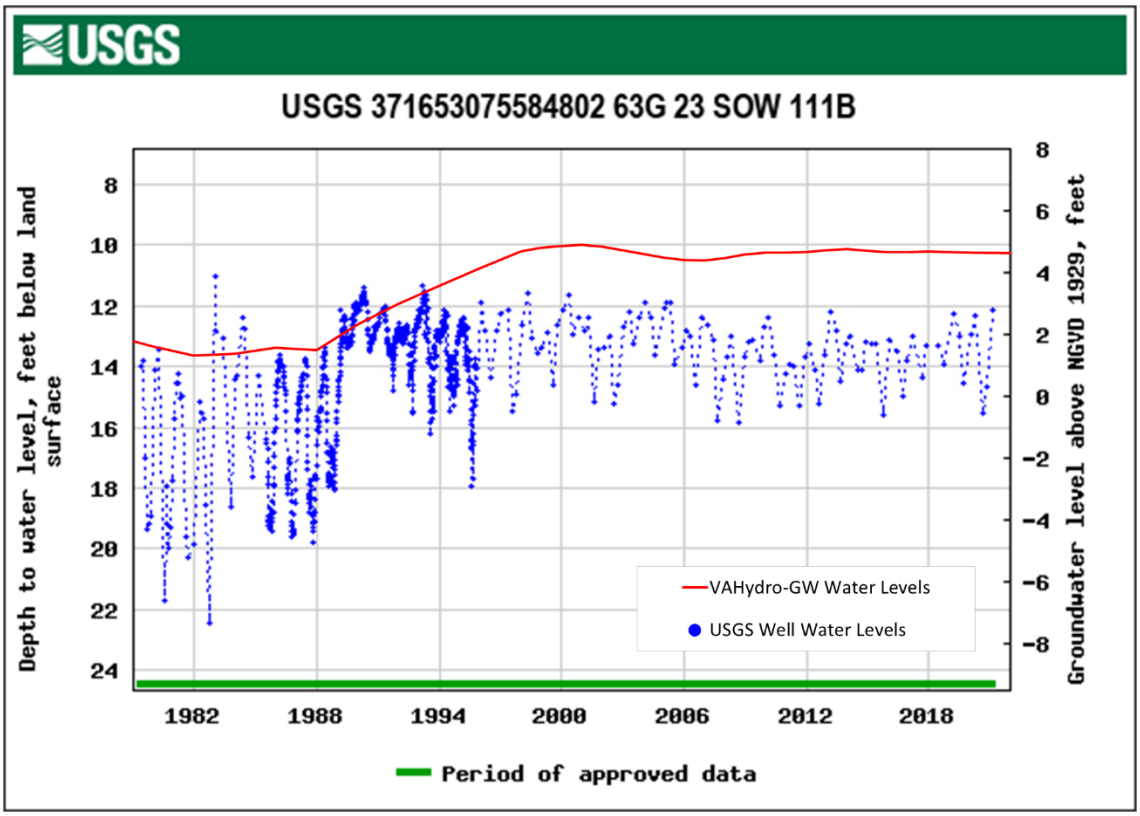


Figure 2. USGS Regional Observation Well 63G 23 SOW 111B, Middle Yorktown-Eastover aquifer water levels recorded from 1979 to present (well depth 280 ft bls, land surface 15 ft msl).

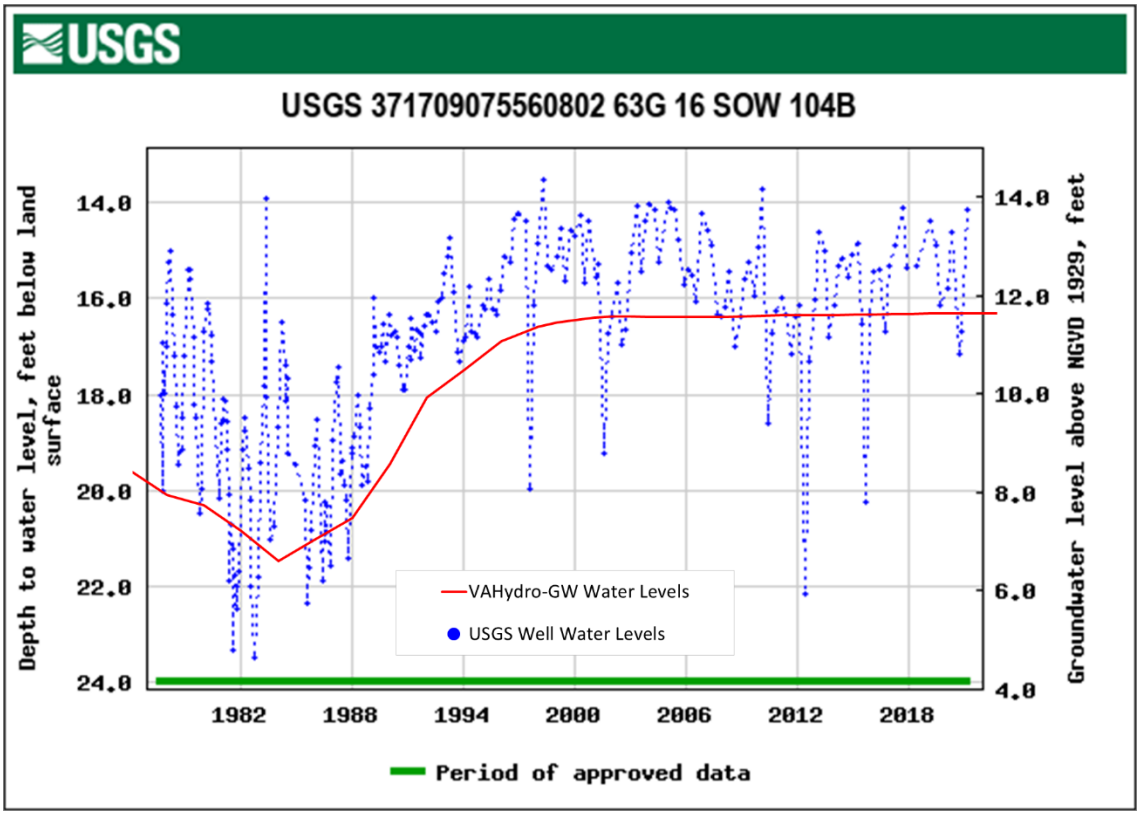


Figure 3. USGS Regional Observation Well 63G 16 SOW 104B, Middle Yorktown-Eastover aquifer water levels recorded from 1977 to present (well depth 240 ft bls, land surface 28 ft msl).

Aquifer Test(s):

An aquifer test has not been conducted at this facility. However, a nearby surrogate aquifer test for the Town of Cape Charles (GW0041200) was used as a reference.

The following table provides the average hydrogeologic properties assigned to the VAHydroGW-ES cell(s) containing the applicant wells.

Virginia Eastern Shore Model Hydrogeologic Properties							
Aquifer	**Top Elevation (feet msl)**	**Top Elevation (feet bls)**	**Aquifer Thickness (feet)**	**Horizontal Conductivity (feet/day)**	**Vertical Conductivity (feet/day)**	**Specific Storage (1/feet)**	**Specific Yield**
Columbia	33	0	73	85	0.5	0.00001	0.15
Upper Yorktown-Eastover	-99	132	42	6	4.1	0.000004	N/A
Middle Yorktown-Eastover	-158	191	55	0	0.5	0.000004	N/A
Lower Yorktown-Eastover	-249	282	161	1	1.6	0.000004	N/A

Model Results

Evaluation of Withdrawal Impacts:

The VAHydroGW-ES model was used to simulate the effects resulting from the proposed withdrawal due to the multi-aquifer impacts. The stabilized effects resulting from the proposed withdrawal were simulated using an annual withdrawal rate of 5,100,000 gallons per year (13,972 average gpd). The stabilized effects were simulated by replacing the reported use amounts in the 2019 VAHydroGW-ES Reported Use Simulation with the current maximum annual withdrawal limit allowed under the terms of

their permit for all Ground Water Management Area (GWMA) permit holders. That same simulation was executed twice, once with the proposed withdrawal removed (the *baseline simulation*), and once with the proposed withdrawal added (the *proposed withdrawal simulation*). The stabilized effects of the proposed withdrawal were considered by simulating both simulations for 50 years and observing the difference in water potentiometric levels at the end of the simulations.

Area of Impact:
The area of impact (AOI) for an aquifer is the area where the additional drawdown due to the proposed withdrawal exceeds one foot. The results of the VAHydroGW-ES simulations, outlined in the preceding section, predict areas of impact in the Upper, Middle, and Lower Yorktown-Eastover aquifers. The AOI areas extend a maximum distance of approximately 0.6 miles from the production center for the Upper, Middle, and Lower Yorktown-Eastover aquifers. These areas are shown in the accompanying maps.

80 % Drawdown:
The 80% drawdown criterion was evaluated for all impacted, confined aquifers in the Virginia Eastern Shore using the VAHydroGW-ES *proposed withdrawal simulation*. The elevations of the top of the Upper, Middle, and Lower Yorktown-Eastover aquifers at the VAHydroGW-ES cell (row 313, column 44) simulating the greatest drawdown are -99, -158, and -249 feet msl, respectively. Based on the results of the *proposed withdrawal simulation*, the predicted potentiometric water levels at the same VAHydroGW-ES cell are 5.1, 2.7, and 4.4 feet msl for the Upper, Middle, and Lower Yorktown-Eastover aquifers, respectively. The 80% drawdown criterion allows the potentiometric water level (based on the critical surface elevation calculated from the VAHydroGW-ES data) to be reduced to -76.8, -124.1, and -196.9 feet msl in the Upper, Middle, and Lower Yorktown-Eastover aquifers, respectively. Therefore, the water levels in the VAHydroGW-ES cells containing the applicant wells for each confined aquifer are not simulated to fall below the critical surface. Additionally, no new VAHydroGW-ES cells are simulated to have water levels fall below the critical surface. Therefore, this withdrawal is within the limits set by the 80% drawdown criterion.

Water Quality:
The EPA has established the National Secondary Drinking Water Regulations (NSDWRs) which are non-enforceable guidelines regulating contaminants that may cause cosmetic or aesthetic (such as taste, odor, or color) effects in drinking water. The EPA recommends the secondary standards to water systems – states may choose to adopt them as enforceable standards. The EPA NSDWRs specify the limit on chloride as 250 mg/L.

The VAHydroGW-ES was created "to help the Commonwealth and local water managers better plan water use and estimate future changes in water and salinity levels in response to changes in water use."[5] Use of the model to predict future chloride concentrations results in a "general useful understanding of system behavior, but water-resource managers must be careful in trusting the accuracy of predictions at individual wells from a regional model."[6] Further, chloride concentrations at individual wells, predicted using the regional model, should not be relied upon to predict actual concentrations at those locations.

The potential for adverse changes to water quality due to the requested withdrawal was evaluated using transient, density-dependent, SEAWAT simulations using the VAHydroGW-ES. Two simulations were executed – one simulation without the proposed withdrawal included and a second with the proposed withdrawal included. Both simulations were executed for 50 years. Both used the 2020 total permitted

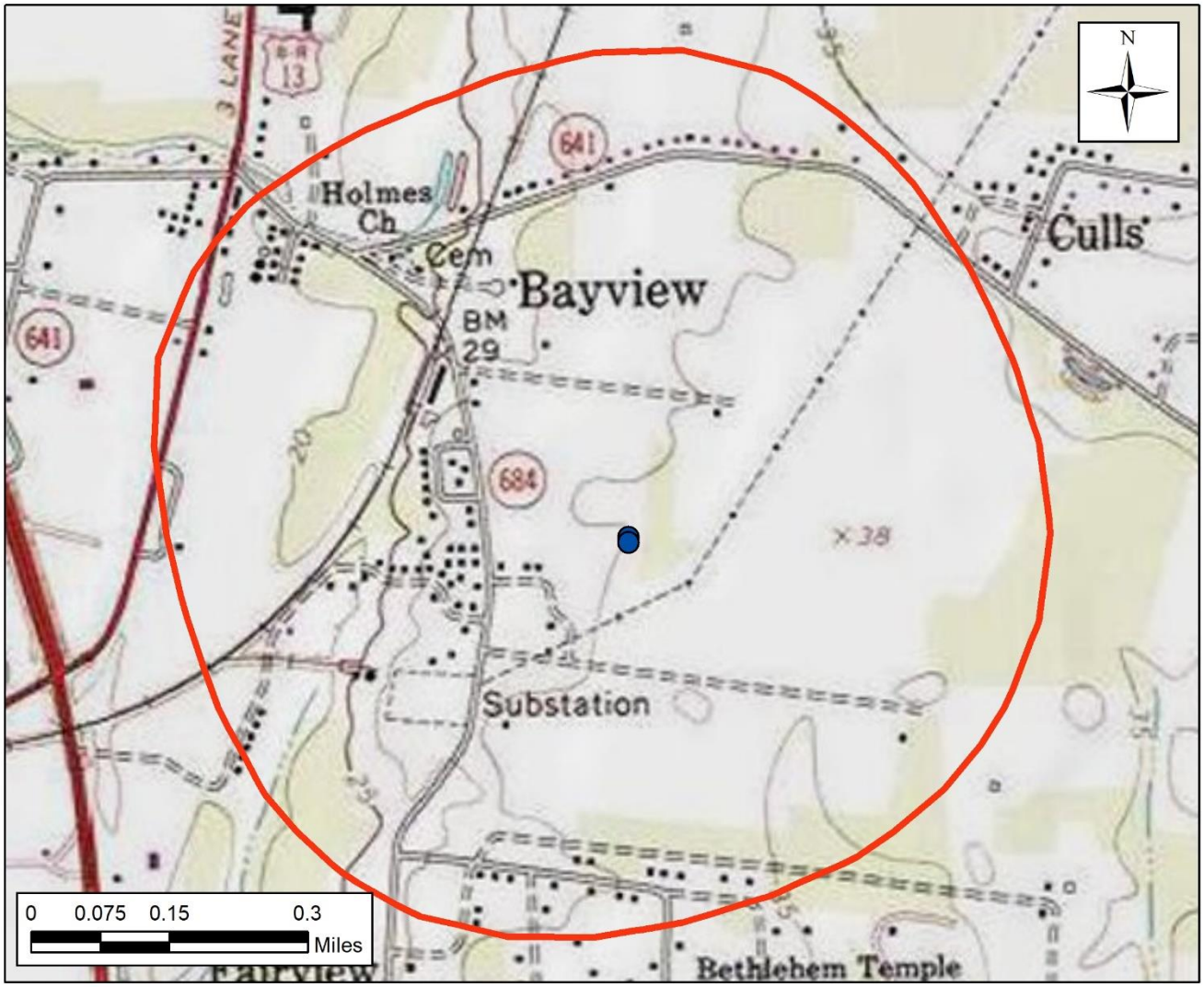
[5] Sanford, W.E., Pope, J.P., and Nelms, D.L., 2009, Simulation of groundwater-level and salinity changes in the Eastern Shore, Virginia: U.S. Geological Survey Scientific Investigations Report 2009–5066, 125 p.
[6] Sanford, W.E. and Pope, J.P., 2009, Current challenges using models to forecast seawater intrusion: lessons from the Eastern Shore of Virginia, USA. Hydrogeology Journal (2009), Volume: 18, Issue: 1, p: 73-93

stresses, concentrations, and heads as starting conditions. In an effort to simulate the long-term effects on water quality due to the proposed withdrawal, the total annual amount of 5,100,000 gallons per year (13,972 average gallons per day) and was used for the duration of the second simulation. The two simulations were compared to evaluate the potential for adverse changes to water quality. The results indicated that no model cells simulate an increase in chloride concentration greater than 250 mg/L due to the proposed withdrawal. Therefore, the VAHydroGW-ES model results do not indicate the potential for reduced water quality as a result of the proposed withdrawal.

Conclusion:

The withdrawal requested by Northampton County for the Bayview Community withdrawal satisfies the technical evaluation criteria for permit issuance. The AOIs for the Upper, Middle, and Lower Yorktown-Eastover aquifers are shown in the following maps. There are no existing permitted wells located within the applicant's AOIs.

Bayview Community
Area of Impact - Upper Yorktown-Eastover Aquifer



Bayview Community Wells

Upper Yorktown-Eastover Area of Impact

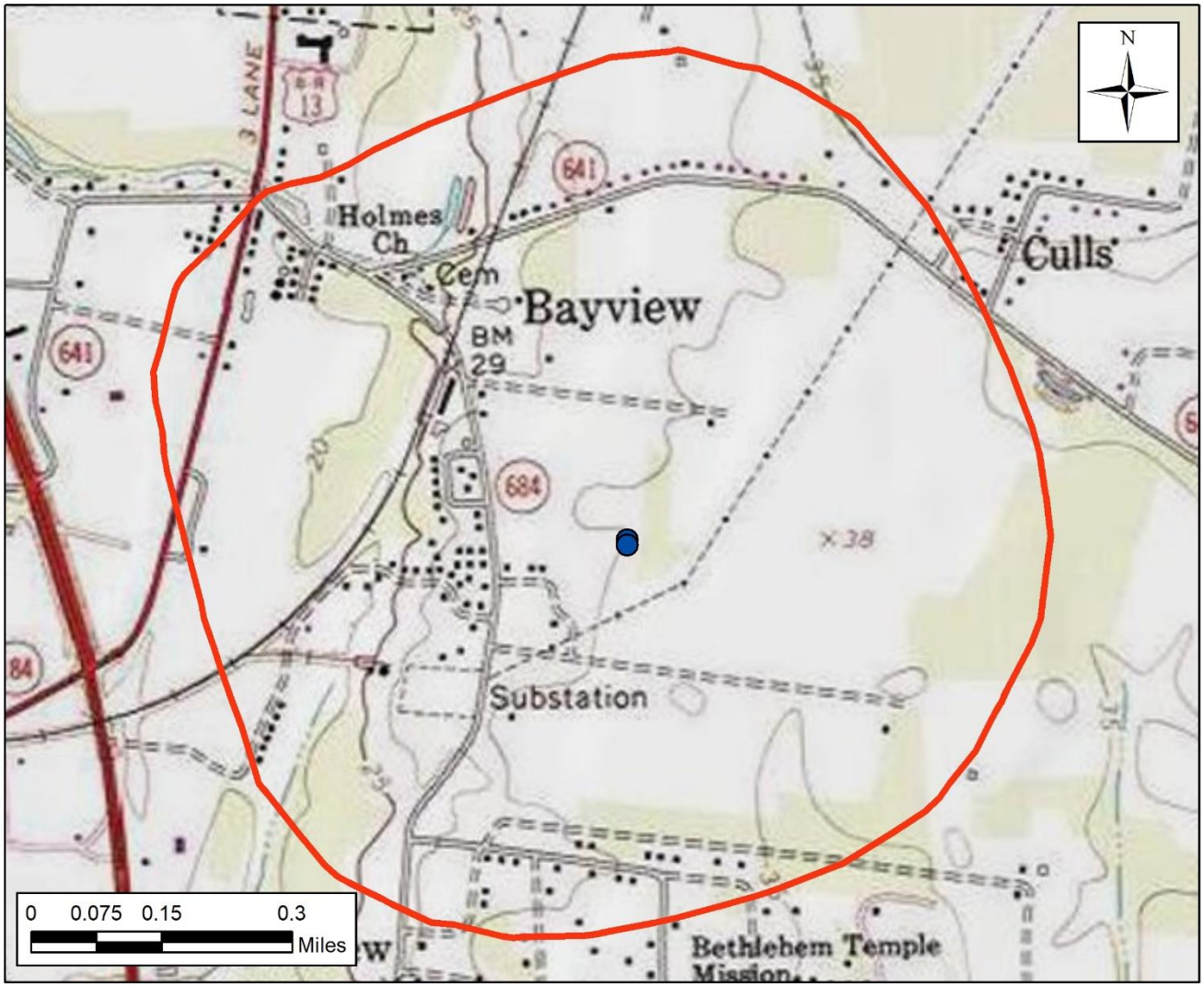
Simulated drawdown at or exceeding one foot in the Upper Yorktown-Eastover (UYE) aquifer resulting from a 5,100,000 gpy, 50 year withdrawal from the Middle Yorktown-Eastover (MYE) aquifer using the VAHydroGW-ES.

Maximum radius of one foot drawdown (Area of Impact) extends approximately 0.6 miles from the pumping center.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
April 28, 2021

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Bayview Community
Area of Impact - Middle Yorktown-Eastover Aquifer



Bayview Community Wells

Middle Yorktown-Eastover Area of Impact

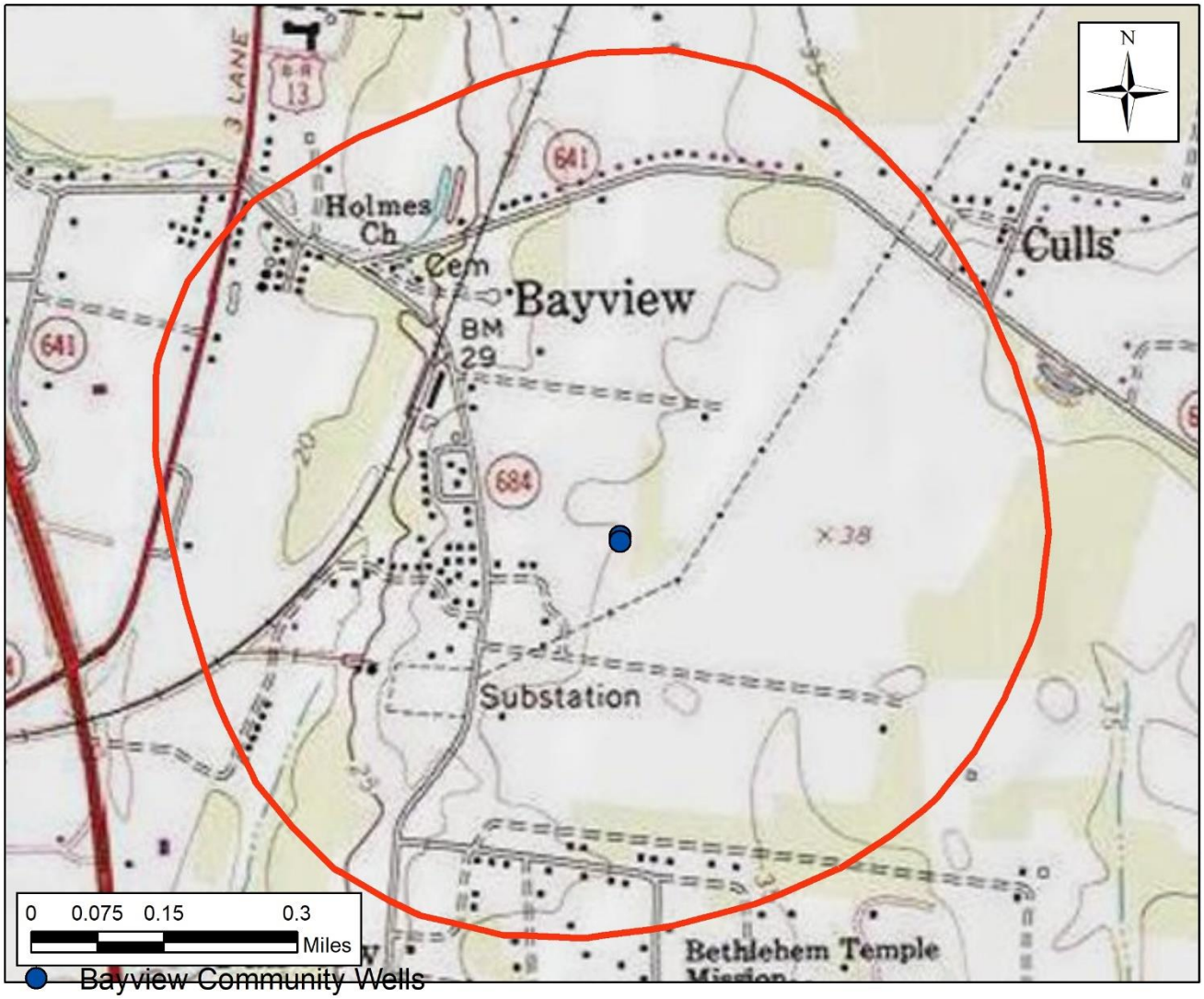
Simulated drawdown at or exceeding one foot in the Middle Yorktown-Eastover (UYE) aquifer resulting from a 5,100,000 gpy, 50 year withdrawal from the Middle Yorktown-Eastover (MYE) aquifer using the VAHydroGW-ES.

Maximum radius of one foot drawdown (Area of Impact) extends approximately 0.6 miles from the pumping center.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
April 28, 2021

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Bayview Community
Area of Impact - Lower Yorktown-Eastover Aquifer

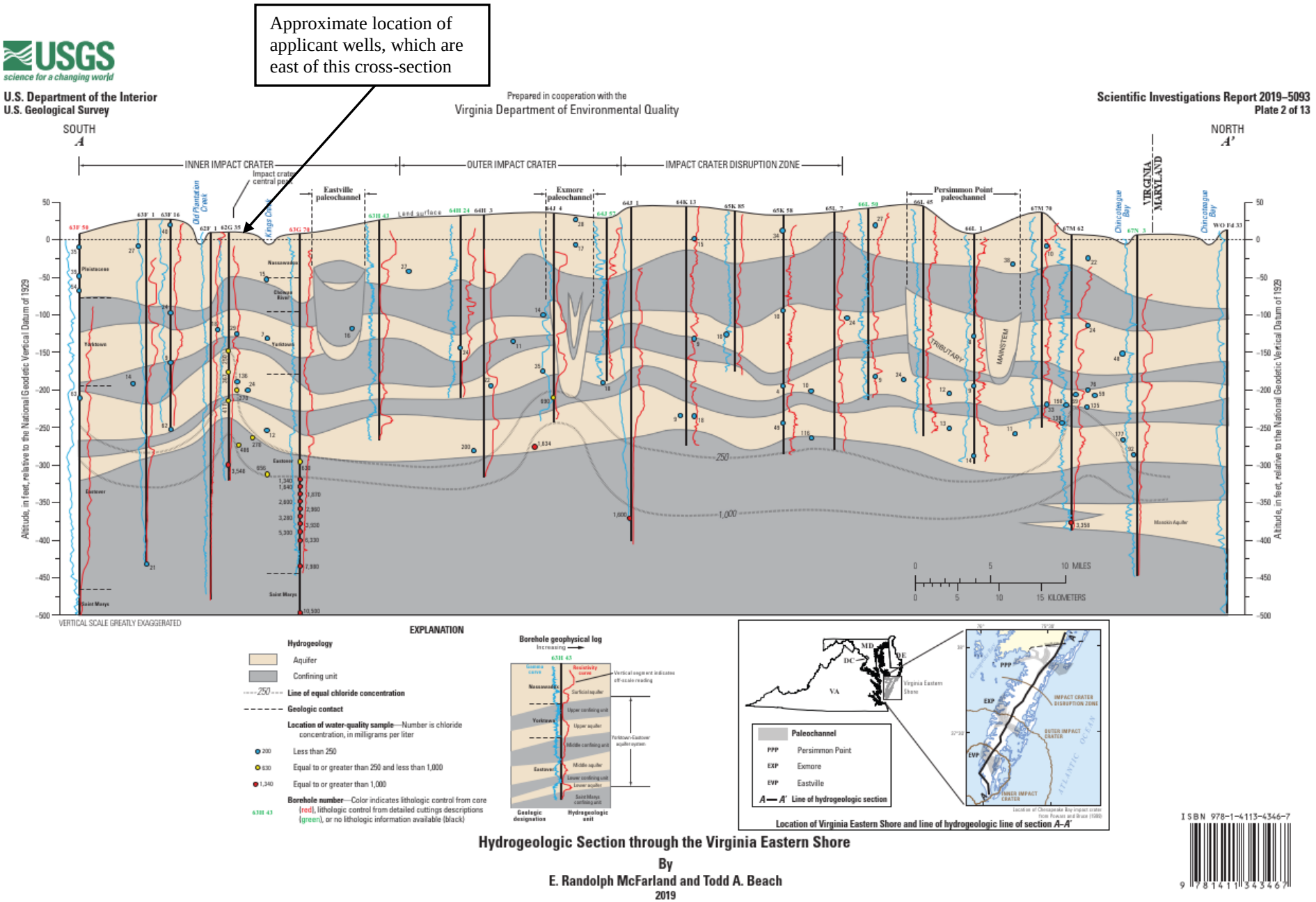


Simulated drawdown at or exceeding one foot in the Lower Yorktown-Eastover (UYE) aquifer resulting from a 5,100,000 gpy, 50 year withdrawal from the Middle Yorktown-Eastover (MYE) aquifer using the VAHydroGW-ES.

Maximum radius of one foot drawdown (Area of Impact) extends approximately 0.6 miles from the pumping center.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
April 28, 2021

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY



Cross-Section A-A' from USGS Scientific Investigations Report 2019-5093 (2019).

Bayview Water System

Water Conservation and Management Plan

SECTION 1: INTRODUCTION

The water withdrawn under this permit will be used to serve the Bayview community in Cheriton, VA. The community is a mix of low income housing. Currently there are 65 equivalent residential connections where a total of 92 are planned.

The complex and water system were constructed with the majority of funding from USDA grants with operation starting in 2003. In 2009 operation of the system was taken over by Northampton County. In 2012 ownership of the system was transferred to Northampton County.

Any recommended changes of procedures pertinent to the system must meet the permit requirements of the Virginia Department of Health/Office of Drinking Water and the Virginia Department of Environmental Quality.

This below sections contain specific information for this system to augment the Northampton County Regional Water Supply Plan approved by the Board of Supervisors of Northampton County on September 13, 2011.

SECTION 2: USE OF WATER SAVING PLUMBING

Northampton County building code references the 2009 Virginia Uniform Statewide Building Code. This code references the 2009 International Plumbing code.

SECTION 3: WATER LOSS REDUCTION PROGRAM

Each well is individually metered and read daily. The connections are metered but have not been previously read or used for billing. Starting September 2014 the residents are to be billed monthly on actual usage.

Daily when the well water meters are read the operator will observe if there are any leaks in the wellhouse or if the there was a significant increase in usage over the previous day.

Monthly the meter totals from the service connections and meters will be audited to determine the amount of unbilled water that is produced.

Excessive use or loss of water above design rates and historical usage will prompt investigation immediately. Water system leaks will be repaired immediately.

SECTION 4: WATER USE EDUCATION PROGRAM

In the information packages to be sent to residents when starting the billing based on usage a brochure on water conservation will be included. The brochure will be the "Be Water Wise" produced by the Virginia Water Resources Research Cent.

A reminder for water conservation will be included with the consumer confidence reports that are published yearly.

The water usage of the system will be reviewed with each monthly billing cycle. If the amount of water usage is determined to be excessive reminders or additional information will be included with the monthly bills. The amount of water usage is a concern due to the limitations of the onsite wastewater disposal system.

SECTION 5: WATER REUSE EVALUATION

Water reuse for the domestic demands of this water system is not economically feasible. The wastewater for this system goes to an onsite disposal system permitted by the Virginia Department of Health such any water not lost from evaporation is returned to the superficial aquifer.

SECTION 6: DROUGHT EMERGENCY CONDITION WATER USE

Drought conditions bring about concerns over water supplies and it is in the best interest of all users to curtail water use over what normal or day-to-day conservation requires.

Drought conditions in the Commonwealth are monitored and determined by the Drought Monitoring Task Force. The representative for the Bayview system is the Northampton County Public Works Director. The Director will declare what level of drought severity to employ based on information received from the Drought Monitoring Task Force and Virginia Drought Coordinator. The Director has the discretion to implement a more severe level than what is recommended by the Drought Monitoring Task Force due to local conditions.

The following stages are to be followed when initiated by the Public Works Director.

6.1. Drought Watch Condition

The following steps shall be taken when a "Drought Watch" is announced:

A. Northampton County Public Works Department will post a sign at the two entrances to the community identifying:
   a. Drought Watch condition is in effect.
   b. Water should be conserved by voluntary curtailment of water use.
   c. Voluntary water curtailment should be limited to reduced irrigation, vehicle washing, etc.

The goal is to achieve a reduction in water use of up to 5%.

6.2. Drought Warning Condition

The following steps shall be taken when a "Drought Watch" is announced:

B. Northampton County Public Works Department will post a sign at the two entrances to the community identifying:
   a. Drought Warning condition is in effect.
   b. Water should be conserved by voluntary curtailment of water use.
   c. Voluntary water curtailment should include:
      i. Limiting irrigation of lawns, flowers, shrubbery to once a week.
      ii. Limiting irrigation to during periods of low evaporation in early morning and evening.
      iii. Limit irrigation to spray nozzles by hand watering instead of sprinklers for flowers, lawns, and shrubbery.
      iv. Limit faucet use and shower duration.
      v. Wash only full loads of laundry.

C. Special attention will be paid to system leaks. Repairs will be conducted as soon as possible.

The goal is to achieve a reduction in water use of 5-10%.

6.3. Drought Emergency

The following steps shall be taken when a "Drought Emergency" is announced:

A. Northampton County Public Works Department will post a sign at the two entrances to the community identifying:

a. Drought Emergency condition is in effect.
b. Mandatory water conservation requirements are in effect.
c. Mandatory water curtailment should include:
    i. Ceasing irrigation of lawns, flowers, shrubbery.
    ii. Ceasing washing of vehicles.
    iii. Limit faucet use and shower duration.
    iv. Wash only full loads of laundry.
d. A $50 fee may billed for each occurrence of violating the above.

D. Special attention will be paid to system leaks. Repairs will be conducted as soon as possible.

E. Service connection meters will be read at the start and conclusion of the Code Red condition.

F. Public works will monitor daily water usage of system. The Public Works Director has the authority during drought emergency to temporarily raise water rates as necessary to further encourage conservation.

The goal is to achieve a reduction in water use of 15%.

SECTION 7: WATER USE EMERGENCY PLAN

This water use emergency plan will be used during emergencies brought about by fires, electrical failure, mechanical failure, etc. as needed regardless of drought condition. An emergency condition is declared when the production of the facility is limited such that it is no longer able to support normal operations.

The Public Works Director will develop a plan that appropriately addresses the severity of the emergency. The plan may include any or all items identified in the Drought Emergency Condition Water Use section as necessary. If the system is to be completely out of service for an extended duration the Public Works Director will coordinate appropriate action such as bottled water and/or bulk water deliveries.

The Public Works Director will notify the County Administrator, Assistant County Administrator, County Sheriff, and Environmental Health Supervisor of the emergency and the plan developed.

MITIGATION PLAN

DEQ GROUNDWATER WITHDRAWAL PERMIT NO. GW0038700

OWNER NAME: Northampton County

FACILITY NAME: Bayview Community

LOCATION: Bayview Community, Cheriton, VA

INTRODUCTION

On June 30, 2014, Northampton County submitted a Groundwater Withdrawal Permit Application to the Virginia Department of Environmental Quality (DEQ) to withdraw groundwater. Groundwater withdrawals associated with this permit will be utilized to provide potable water to the Bayview Community.

The purpose of this Mitigation Plan is to provide existing groundwater users a method to resolve claims that may arise due to the impact of the withdrawal from Bayview Community well field. Predicted drawdown of water levels due to the withdrawal(s) from the Middle Yorktown-Eastover aquifer are shown in the attached maps.

Modeled impacts, as shown on the attached maps, extend beyond the boundary of the Bayview Community facility. Due to these findings, Northampton County recognizes that there will be a rebuttable presumption that water level declines that cause adverse impacts to existing groundwater users within the area of impact are due to this withdrawal. Claims may be made by groundwater users outside this area; however, there is a rebuttable presumption that Northampton County/Bayview Community has not caused the adverse impact. Northampton County proposes this plan to mitigate impacts to existing users and excludes impacts to wells constructed after the effective date of this permit.

CLAIMANT REQUIREMENTS

To initiate a claim, the claimant must provide written notification of the claim to the following address:

Contact Name:	Chris Thomas
Title:	Director of Public Works & Operations
Permittee Name:	Northampton County
Address:	16404 Courthouse Road, P.O. Box 66
City, State Zip Code	Eastville, VA 23347

The claim must include the following information: (a) a deed or other available evidence that the claimant is the owner of the well and the well was constructed and operated prior to the effective

date of the permit; (b) all available information related to well construction, water levels, historic yield, water quality, and the exact location of the well sufficient to allow Northampton County to locate the well on the claimant's property; (c) the reasons the claimant believes that the Bayview Community withdrawal has caused an adverse impact on the claimants well(s).

CLAIM RESOLUTION

Northampton County will review any claim within **five (5) business days**. If Northampton County determines that no rebuttal will be made and accepts the claim as valid, Northampton County will so notify the claimant and will implement mitigation within **thirty (30) business days**. If the claim is not accepted as valid, Northampton County will notify the claimant that (a) the claim is denied **or** (b) that additional documentation from the claimant is required in order to evaluate the claim. Within **fifteen (15) business days** of receiving additional documentation from the claimant, Northampton County will notify the claimant (a) that Northampton County agrees to mitigate adverse impacts or (b) the claim is denied. If the claim is denied, the claimant will be notified that the claimant may request the claim be evaluated by a three (3) member committee. This committee will consist of one (1) representative selected by Northampton County one (1) representative selected by the claimant, and one (1) representative mutually agreed upon by the claimant and Northampton County.

Any claimant requesting that a claim be evaluated by the committee should provide the name and address of their representative to Northampton County. Within **five (5) business days** of receipt of such notification, Northampton County will notify the claimant and claimant's representative of the identity of Northampton County representative and instruct the representatives to select a third representative within **ten (10) business days**. Representatives should be a professional engineer or hydrogeologist with experience in the field of groundwater hydrology. Northampton County agrees to reimburse the members of the committee for reasonable time spent, at a rate prevailing in the area for experts in the above listed fields, and for direct costs incurred in administering the plan. The claimant may, at his or her option, choose to provide the reimbursement for the member of the committee selected by the claimant and up to half of the reimbursement for the mutual representative.

Within **ten (10) business days** of selection of the third representative, the committee will establish a **reasonable deadline** for submission of all documentation it needs to evaluate the claim. Both the claimant and Northampton County will abide by this deadline.

Within **fifteen (15) business days** of receipt of documentation, the committee will evaluate the claim and reach a decision by majority vote. The committee will notify the claimant regarding its decision to (a) deny or (b) approve the claim. If the claim is approved, Northampton County will mitigate the adverse impacts within **thirty (30) business days** of making the decision or as soon as practical. If the claim is denied by the committee, Northampton County may seek reimbursement from the claimant for the claimant's committee representative and one half of the 3rd representative on the committee.

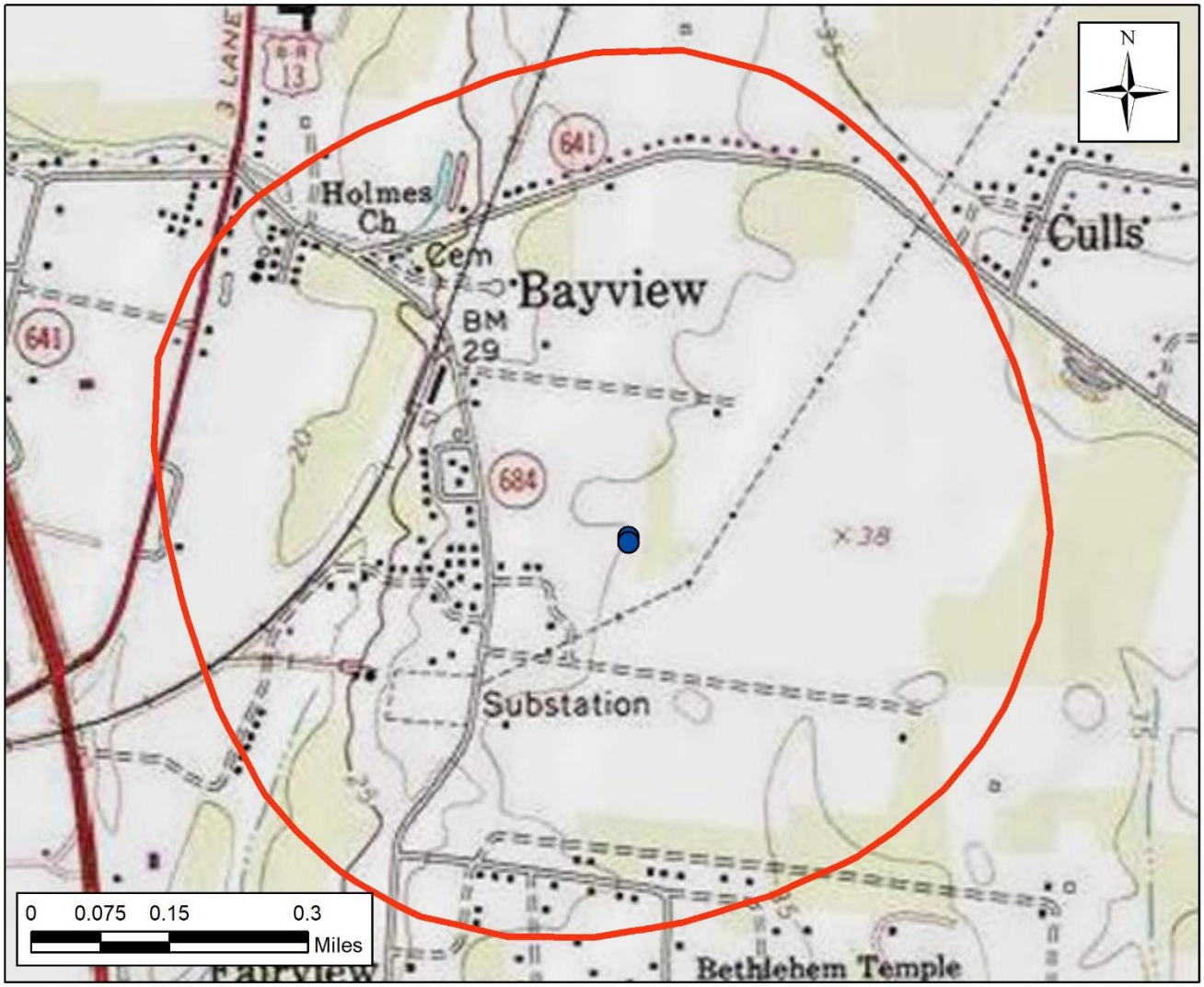
If a claimant within the indicated area of impact indicates that they are out of water, Northampton County will accept the responsibility of providing water for human consumptive needs within **seventy-two (72) hours** and to cover the claim review period. Northampton County reserves the right to recover the cost of such emergency supply if the claim is denied by Northampton County or found to be fraudulent or frivolous. If Northampton County denies a claim and the claimant elects to proceed with the three (3) member committee, Northampton County will continue the emergency water supply at the claimants request during the committee's deliberations, but reserves the right to recover the total costs of emergency water supply in the case that the committee upholds the denial of the claim. Similarly, Northampton County reserves the right to recover costs associated with the claim process if a claim is found to be fraudulent or frivolous.

If it is determined by the committee or shown to the committee's satisfaction that a well operating under a mitigation plan similar to Northampton County/Bayview Community Plan other than those owned and operated by Northampton County has contributed to the claimed adverse impact, Northampton County's share of the costs associated with mitigation will be allocated in proportion to its share of the impact. Such a determination shall be made by the committee after notification of the third party well owner, giving the third party well owner opportunity to participate in the proceedings of the committee.

PLAN ADMINISTRATION

Nothing in the Plan shall be construed to prevent the Department of Environmental Quality Staff from providing information needed for resolution of claims by the committee.

Bayview Community
Area of Impact - Upper Yorktown-Eastover Aquifer



Bayview Community Wells

Upper Yorktown-Eastover Area of Impact

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Maximum radius of one foot drawdown (Area of Impact) extends approximately 0.6 miles from the pumping center.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
April 28, 2021

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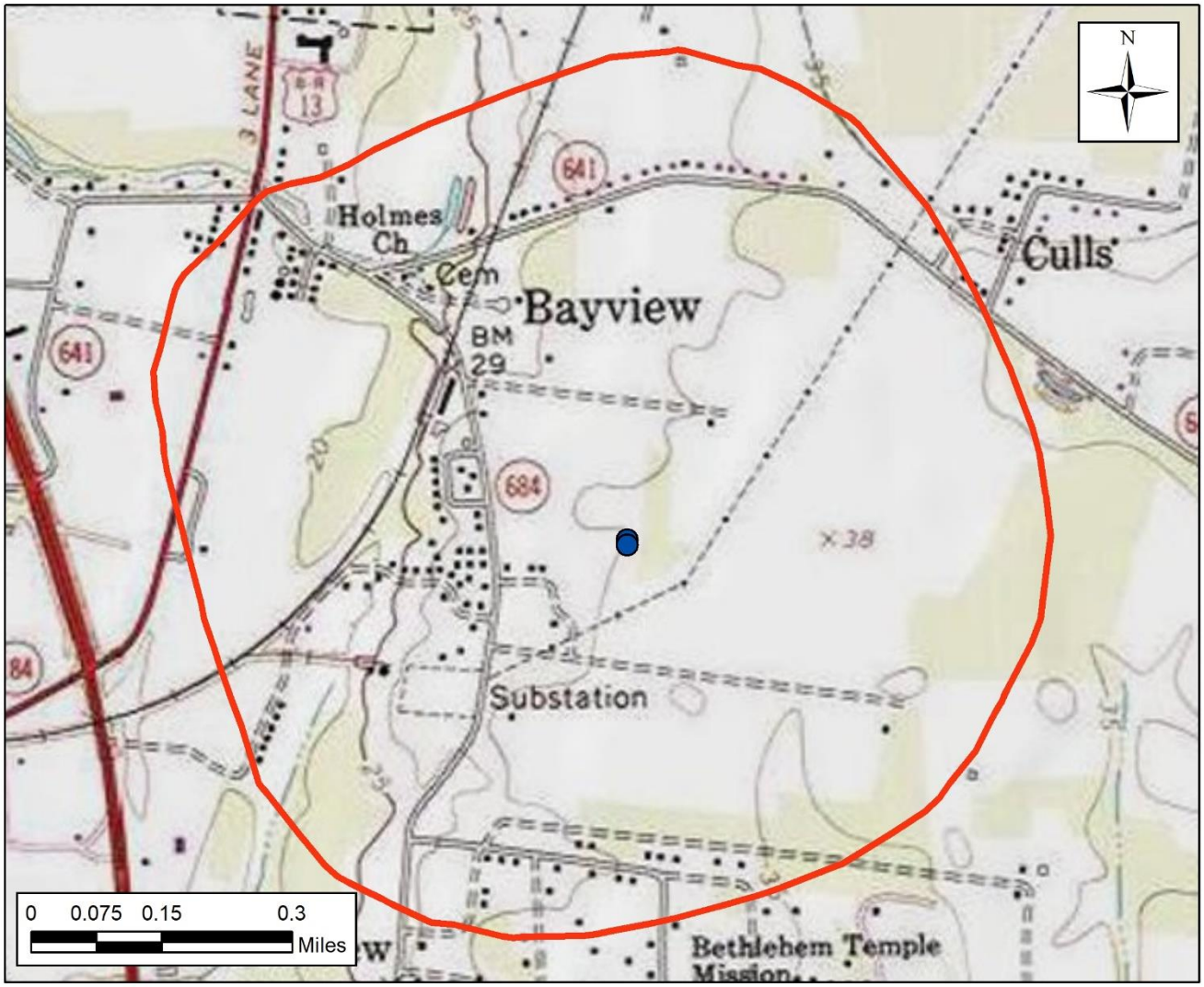
Bayview Community
Area of Impact - Middle Yorktown-Eastover Aquifer



Bayview Community Wells

Middle Yorktown-Eastover Area of Impact

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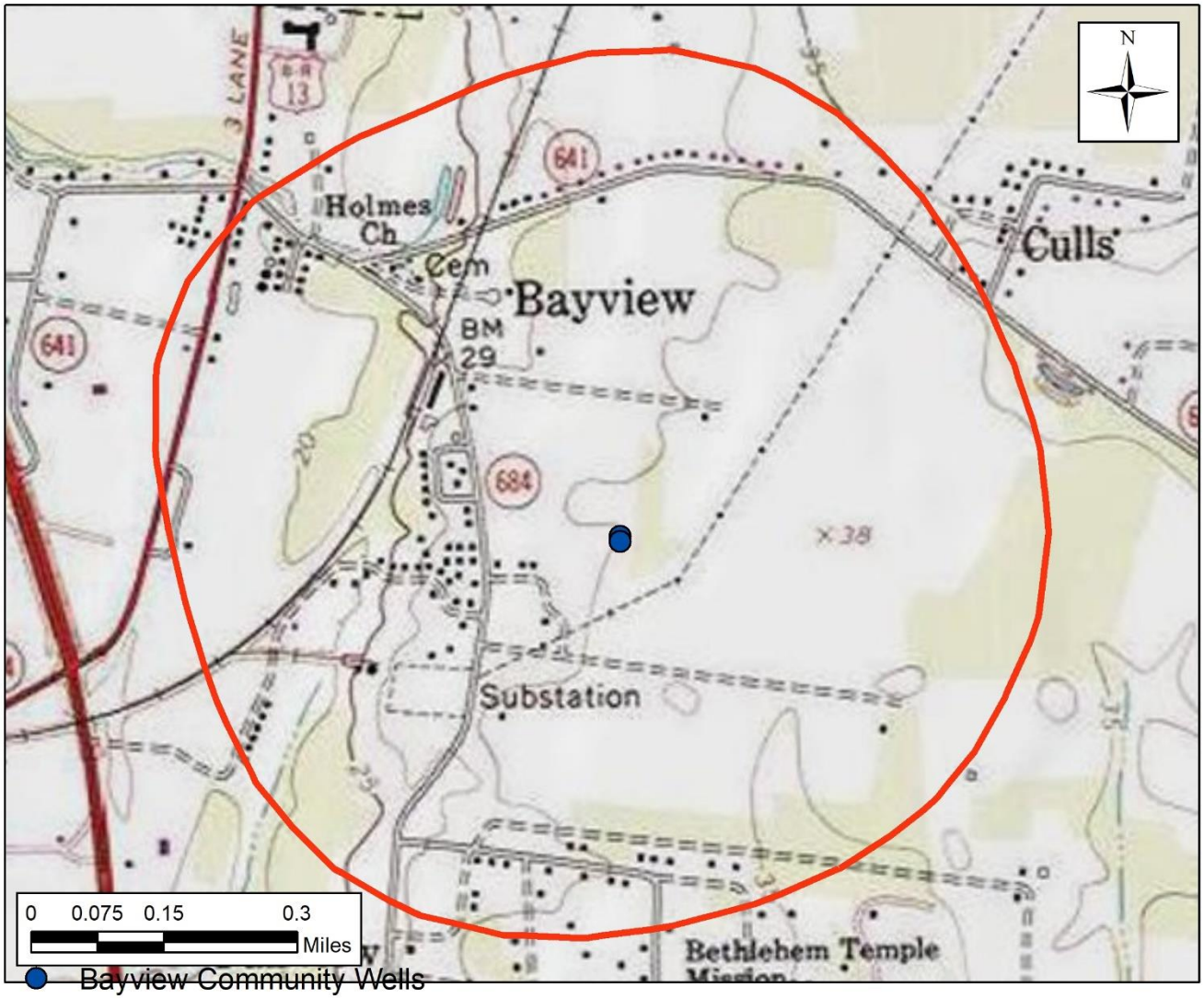

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